



CHAPTER II

PROBLEMS ANALYSIS AND SOLUTIONS PROPOSAL

As mentioned in the chapter 1 that the Company's warehouse has been long suffering from a variety of problems, so this study aims to achieve the warehouse improvement. Prior to improving activities being performed, however, problems and root causes are impelled to be thoroughly analyzed and fully understood in order to help generate the correct and rational solutions. Under this concept, the current warehouse physical condition and operations are analyzed on which the root causes are explored. Simultaneously, the information and data associating to the current warehouse are collected at this stage. Therefore, this chapter will discuss the analysis of the current warehouse problems and explosion of the root causes.

2.1 Problem Correlation

No problem exists independently and there is always correlation between problems. In another word, one problem is likely to trigger the others which may further generate more. Because of this, the problems are differentiated between "parent" and "subsidiary" and parent problems trigger the subsidiary ones.

Based on this principle, at the very beginning of problems analysis, it is wise to analyze problem correlation. The reason of distinguishing parent and subsidiary problems is to erect a clear structure for logic problem-solving. It can be considered that if the parent problems can be tackled, the subsidiary ones are readily solved. Thus, it is essential to sort out parent problems at the first place. Meanwhile, identifying the parent problems also aims to explore the root causes. This is because that the factors triggering the parent problems are regarded as the root causes. For these reasons, problems correlation analysis is conducted in advance.

In addition to the principle itself, the corresponding structure tree for problem correlation is worth being established. The advantage of structure tree is clearly

describing problem correlation for easily understanding and analysis.

With the assistance of problem correlation tree, therefore, the correlation between six warehouse problems stated in chapter 1 is illustrated in figure 2.1 below.

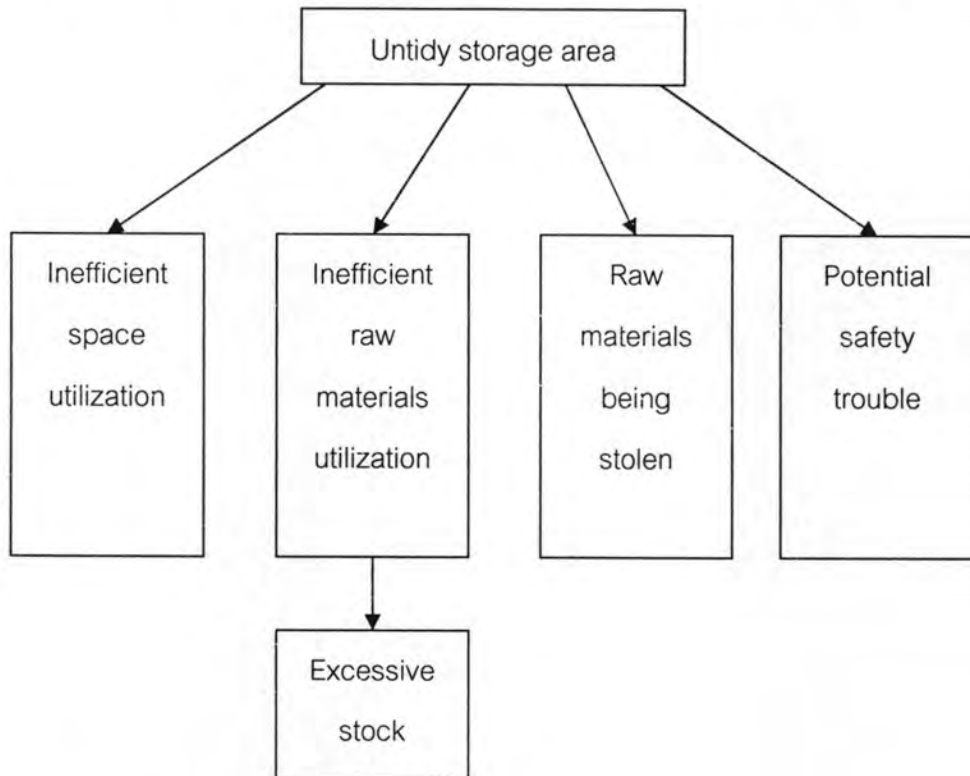


Figure 2.1: Problem correlation tree

As depicted in the figure 2.1 above, the problem of “Untidy storage area” is distinguished as the parent problem, which directly or indirectly produces the other five subsidiary problems. The decision for this identification is made on the fact that the warehouse messy condition prohibited the attempts to systemically manage the raw materials as well as the disarrayed stock took up a large amount of useful space. Therefore, untidy storage area simultaneously aroused it-related four subsidiary problems. Also, the subsidiary problem, “Inefficient raw materials utilization”, straightly triggered the problem, “Excessive stock”. This is because that the useful raw materials are unable to be efficiently used, the excessive steel stock turned up as a must.

2.2 Root Causes of Problems

Knowing the parent problem, the root causes are able to be explored

subsequently. Following are the root causes leading to the current warehouse poor performance.

1) No proper material storage equipments

One root cause is defined as no proper material storage equipments for the steel stock. Although the Company possesses some racks (see figure 2.2) in the warehouse, they are not helpful any more.

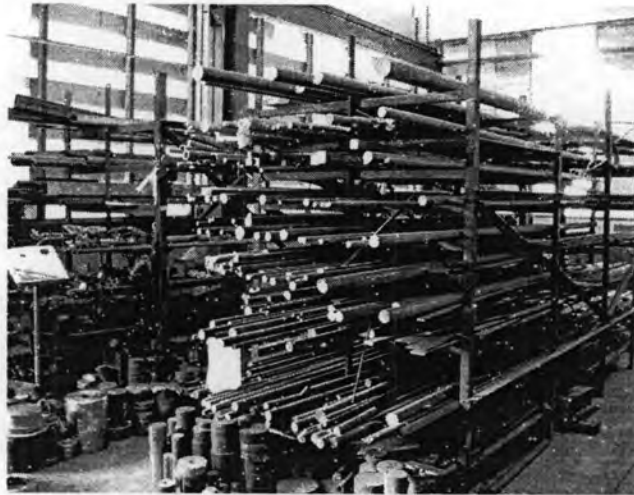


Figure 2.2: Small racks being used by the Company

Seen from figure 2.2 above, the small-scale racks have been built and in use to hold small size steel bars at the time of the Company starting its business. However, as the Company's business was growing up, the large size steel bars (see figure 1.1) came into the warehouse. Although the interval space between two adjacent horizontal bars of the racks still meets the dimension requirements of several big steel bars, due to constraints of structure and load capacity, the small racks were not capable to accommodate those big steel bars. Without proper storage equipment, the only way that the workers can follow was just putting them on the unoccupied space of the warehouse floor. Day after day, the big steel bars were piled up. As a result, the stock area became untidy and the available steel bars could not be used.

2) Inappropriate warehouse layout setup

It is obvious that there was no proper layout setup for the warehouse at the very beginning to arrange the raw materials. No appropriate storage area and aisle layout were taken into account at that time. Two racks were just placed in the warehouse and no considerations were given to the prospective raw materials. As the different raw materials came into the warehouse and no appropriate layout existed, the employees had no ideas of where to store them to avoid the inconveniences. Due to this situation, the raw materials were placed on any vacant space. As time went on, after the usable horizontal space was totally consumed, the steel bars were stacked accordingly, which resulted in inefficient warehouse space utilization.

3) Unclear responsibility in the warehouse

Almost anything results from human's consciousness and action. Warehouse is not an exception. Unclear responsibility in the warehouse can be looked as one critical root cause which triggered all of problems mentioned above. This is largely because the warehouse is located in the production plant and shared by all employees there. Thus, no fixed workers have been assigned to manage and control it. The managers also have to share the blame since they did not offer sufficient concerns and efforts to manage this situation. As no employees and managers paid interests on the warehouse poor performance, the condition was continuously getting worse. This can be reflected by the safety trouble and raw materials pilferage.

Since there is no injury occurred before, the management and employees were confident of the warehouse safety and did not pay sufficient attention on the potential accident. Consequently, the rubber elastic rope has been used until then and no individual commitment and relevant policy has ever been established. Therefore, the operators have no safety operating procedure to follow, no safety rule to obey and no safety training to receive.

Also, since no security plans have been formulated by managers or

supervisors as well as no monitoring instruments have been installed and used during the daytime and night, it gave the greedy employees chances to steal the raw materials. Steel bars were frequently stolen by employees during the night and the thefts were never been captured. The managers fed back that although the door of plant was ensured to be close after the off-duty every day, the steel bars were still being stolen twice a week.

4) Poor warehouse operation

The current warehouse operations can be described as inefficient since no formal systemic process existed in the warehouse at all, especially for the inbound and outbound operation procedure, after talking with the managers and working staffs. As a result, poor warehouse operation is regarded as another serious root cause generating all of the problems mentioned above. In order to prove it, the inbound and outbound operations are identified through observation and described as follows in advance.

● Inbound operation

As there is no formal inbound operation system being designed to follow, raw materials inbound activities are observationally identified from the current operations and its flow processing is charted in table 2.1 below.

After the raw materials being delivered to the warehouse, frequently, rather than the warehouse staffs, the workers from other functions in the plant, such as production line, come to the warehouse, and then conduct the raw materials inbound operation. In the case of no employees are available at that time, this task has to be delayed, which, in some cases, directly delay the schedule of the production line. Commonly, 5 minutes have to be spent on waiting for the arrival of operators. After the inspection, the results are reported back to the purchasing department where subsequently assigns the staffs to sign order invoice. On the completion of the invoice verification, the workers use the overhead crane to move raw materials to the

unoccupied space of stock area without any classifying, arranging and recording activities.

Summary	No.	Min.	Operation <u>Raw materials inbound</u>	
○	2	2	Department <u>Warehouse</u>	
➡	1	0	Sheet 1 of 1	
□	1	3	Charted by:	
D	3	15	Data:	
△	1	3	Present method <u>X</u>	
Total	8	23	Proposed method	
Feet of travel				
No.	Dist. Moved (mm)	Worker Time (Min.)	Symbols	Description
1			○➡□D△	Material incoming
2		5	○➡□D△	Wait for inspection
3		3	○➡□D△	Inspection
4		1	○➡□D△	Report to the purchase department
5		5	○➡□D△	Wait for sign invoice
6		1	○➡□D△	Sign invoice
7		5	○➡□D△	Look for vacant space
8		3	○➡□D△	Raw materials storage

Table 2.1: Flow-processing chart for current inbound operation

● **Outbound operation**

Same as the inbound operation, the current outbound activities are identified by observation. Since the outbound activities are not coherent, rather than the flow-processing chart, the block-diagram flowchart is preferred to depict. (See figure 2.3)

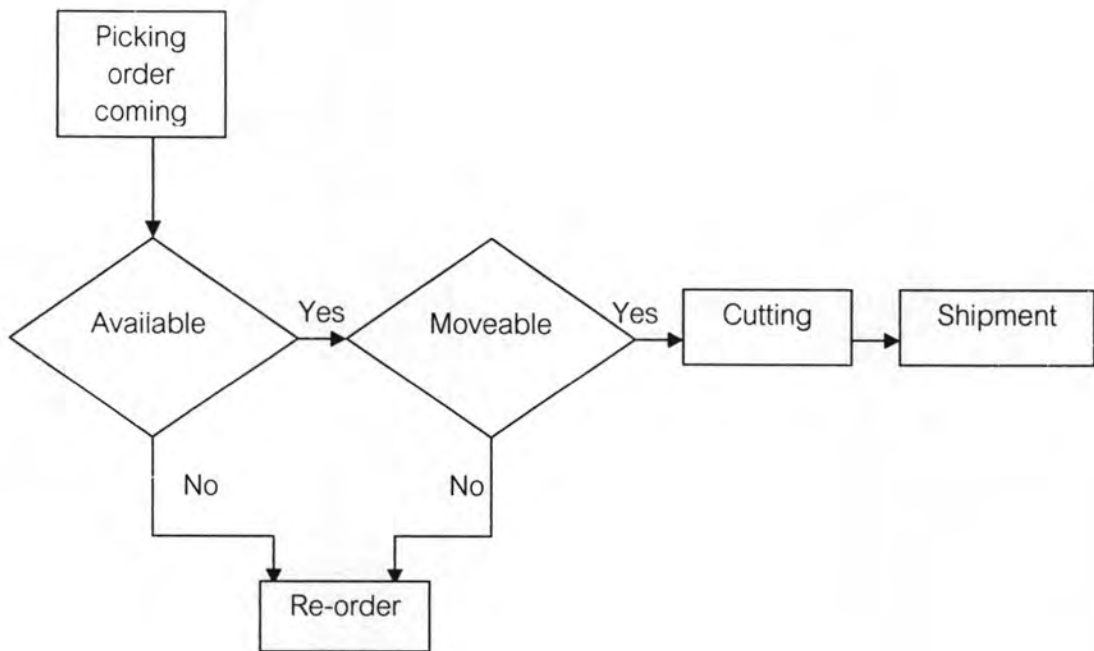


Figure 2.3: Current raw materials outbound procedure

While the picking orders from the production line arrive, the workers firstly check the raw materials in the stock area according to the demand. Since there are various types of materials and no obvious marks or symbols have been signified to distinguish them, it always takes labors long time to identify the material type in the first place. If the raw materials are not at hand, the new order is placed. In the case that raw materials are available at the top position and easy to move, they are checked out by using the overhead crane. In the case of useful steel bars getting stuck at the bottom, the top ones have to be moved away firstly and it always take a great deal of time to gain the bottom steel bars. If it is really difficult to move them out from the interior due to the weight constraint, the new order is placed instead of raw material movement. Thus, the production line has to wait until the new order being delivered. In case that the employees are not sure the specific quantity of available raw materials, the new order is placed as well for the sake of saving time under certain urgent circumstances. Before the raw materials being shipped to the production line, they are cut into pieces by the cutting machine according to the requirement.

- **Summary**

Judging from the inbound and outbound operation being identified above, the warehouse operation can be considered as poor. Primarily, there is no systemic approach to pick and store the raw materials, which directly lead to the untidy situation of the warehouse. Also, the operation procedure is not efficient. The inbound or outbound operation normally takes about 20-25 minutes since too much time is wasted on the waiting activities. Moreover, there is no information tracing activity to monitor the raw materials, which leads to some available steel bars unable to be used. The poor operations also result in the problem of space inefficient utilization since there is no sufficient space in the stock area for conserving the likely extra raw materials and the stock area is able to allow only one person to pass through.

2.3 Proposed Solutions

Distinguishing and understanding the root cause of the problems, the feasible solutions towards them can be basically proposed.

- 1) *Designing the appropriate storage equipments* to satisfy the requirement of big size steel bars is regarded as an immediate solution. As long as they are brought into the warehouse, the big steel bars can be moved from the floor and the untidy condition is partly able to be removed. At the same time, more vacant space might emerge as a result.
- 2) *Warehouse layout proper setup* is supposed to help realize the good arrangement of raw materials and space utilization. Thus, it is able to address the warehouse messy situation and eliminate the employee confusion of where to place the raw materials during the inbound operation.
- 3) *New systematic operation procedure* is also required to formulate in order to not only tackle the problems of space inefficient utilization generated by the current poor

warehouse operations, but also achieve the ultimate good warehouse operations performance, such as time-consuming.

4) *Proper inventory records* aims to get rid of employee's uncertainty on the quantity and location of available raw materials, which is mainly caused by poor operations. It intends to keep raw materials under good management and control by monitoring and tracing the information flow across the operations.

5) *Handling system design* is assumed to be the result of new warehouse operations. Since the efficient warehouse operation demands systemic movement of raw materials and might require the new handling equipments, the development of handling system should be taken into account.

6) *Formulation of safety measures* is to address the potential safety hidden trouble within the warehouse mentioned above. This is considered as an indispensable and straightforward solution to eliminate the possible injury and accident as well as to well manage the total safety performance. *Security plan* is developed as an immediate solution to prevent the raw materials from being stolen. It is expected that the warehouse can be well secured by establishing the security rule and other effective measures.

The six solutions proposed above are based on the roots causes explored previously. It is considered that if these root causes are able to be tackled, the warehouse improvement can be achieved.